

FBS04- Use of Alternate Light Source to Aid in Stain Identification

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1. Scope

- 1.1. This procedure is used to help locate possible stains of biological origin for additional testing and identification.

2. Background

- 2.1. An alternate light source (ALS) may be used to facilitate the visualization and detection of body fluids (e.g. saliva, semen, sweat or urine) on items of evidence. Upon illumination by the ALS at a specific wavelength, a biological stain may emit fluorescence which can be observed, marked and diagrammed. The stain can then be further characterized by using presumptive and/or confirmatory tests.

3. Safety

- 3.1. Wear personal protective equipment (e.g., lab coat, gloves, mask, eye protection), when carrying out standard operating procedures (SOPs).
- 3.2. Read Safety Data Sheets (SDSs) to determine the safety hazards for chemicals and reagents used in the SOPs.
- 3.3. Use ALS instrumentation in a dark room.
- 3.4. The appropriate color goggles, based on wavelength being used, must be worn when viewing items under ALS. See user manual(s) for further instruction on what color goggle to wear with each wavelength.

4. Materials Required

- 4.1. ALS [ROFIN Polilight PL 400 and/or Polilight Flare Plus 2]
- 4.2. Orange Goggles, Clear Goggles, Red Goggles, Yellow Goggles
- 4.3. Positive Control- Semen (FBR03)
- 4.4. Negative Control- Unstained, Sterile Cotton Sheeting

5. Standards and Controls

- 5.1. The Positive and Negative Controls are tested prior to daily use. Record the results in the applicable Sample Tracking and Control Solutions (STACS) documentation.
 - 5.1.1. A known semen stain is tested as a Positive Control (FBR03). This control will exhibit a fluorescent glow when viewed under the ALS using the A450 (wavelength of 450 nm) with orange goggles.
 - 5.1.2. A sterile, unstained piece of cotton sheeting is tested as a Negative Control. This control will not exhibit a fluorescent glow when viewed under the ALS using the A450 with orange goggles.

6. Procedures

- 6.1. Polilight PL400:
 - 6.1.1. Turn on the main switch (fans, lamp, and power supply). Check that the fans are clear of any obstructions.
 - 6.1.2. Check to be certain that the filter is set on the white light setting. Darken the room completely.
 - 6.1.3. Put on orange goggles.
 - 6.1.4. Change the filter to A450 for screening items of evidence for biological fluids (e.g. saliva, semen, sweat, or urine). Vary the angle and distance of the light source to search the item for possible stains. (**Note:** To aid in visualization, different wavelengths may be used. If using a wavelength other than 450nm, check the Polilight PL400 Instruction Manual to determine which color goggles to use. Also check the positive and negative controls at the alternative wavelength and document this information in the casework notes.)

6.1.5. Mark the fluorescent areas using tape, marker or some other identifier for further testing. Be aware that blood will not fluoresce, however, it may appear as a darker area when viewed under the A450. Record the results in the applicable STACS documentation.

6.1.6. When the examination is complete, change the filter back to the white light setting and turn off the main switch.

6.1.7. Note: Do not restart the lamp when the bulb is hot. Wait for the bulb to cool before restarting the power supply.

6.2. Polilight Flare PLUS 2 (Flare+2):

6.2.1. Darken the room completely.

6.2.2. Put on orange goggles.

6.2.3. To switch the light ON, turn the ring at the base of the head to the left and release.

6.2.4. Once the light is turned on, turn the ring to the right to cycle through intensities. The intensity will continue cycling in steps between 100%, to 35%, to 100%, as long as the ring is held to the right.

6.2.5. To lock the flare, turn the ring to the left and release four times in quick succession to lock the unit. The unit can be unlocked by repeating the pattern.

6.2.6. Vary the angle and distance of the light source to search the item for possible stains. The strobing feature may be used to assist in visualization of stains where both the background and the evidence fluoresce. The strobing feature increases the intensity above the 100% continuous value to 150%. In some situations the contrast can be improved compared to continuous illumination. To select strobing turn the ring at the base of the head to the left and hold. The light will continue to strobe until the ring is released.

6.2.7. Mark the fluorescent areas using tape, marker or some other identifier for further testing. Be aware that blood will not fluoresce, however, it may appear as a darker area when viewed with 450 nm. Record the results in the applicable STACS documentation.

6.2.8. When the examination is complete, switch the light OFF by turning the ring on the base of the head to the left and release.

6.2.9. To charge the battery, push the base of the handle into the charging cradle, orientating the guide on the base of the handle so that it is aligned with the slot on the charging cradle. When the battery is charging the ring

on the charging cradle glows orange. When the battery is fully charged the ring glows blue.

7. Sampling

7.1. Not applicable

8. Calculations

8.1. Not applicable

9. Uncertainty of Measurement

9.1. Not applicable

10. Limitations

10.1. It is noted that there are a variety of body fluids and substances which also fluoresce under the alternate light source. This procedure is an effective tool for locating stains to be more thoroughly tested and either included or eliminated as possible sources of DNA.

11. Documentation

11.1. Applicable STACS documentation

12. References

12.1. Polilight PL400 Instruction Manual, ROFIN Australia Pty. Ltd.

12.2. Polilight Flare PLUS 2 User Guide, Rofin Australia Pty. Ltd.

12.3. Positive Control – Semen (FBR03)

12.4. Forensic Biology Unit Quality Assurance Manual